**Ecology Unit Review Guide**

**Energy & Food (Chapter 2)**

1. Define the following:
   1. Ecology, ecosystem, habitat

**Ecology: the study of interactions that take place between organisms and their environment**

**Ecosystem: made up of interacting populations in a biological community and the community’s abiotic factors**

**Habitat: a place where an organism lives out its life**

* 1. Mutualism, commensalism, parasitism

**Mutualism: relationship in which both species benefit**

**Commensalism: relationship in which one species benefits and the other is neither harmed nor helped**

**Parasitism: relationship in which one species benefits while harming the other**

* 1. Carnivore, omnivore, herbivore

**Carnivore: only eats meat/other animals**

**Omnivore: eats both plants and animals**

**Herbivore: only eats plants**

* 1. Producer, consumer, decomposer

**Producer: an organism capable of making its own food and energy**

**Consumer: an organism that eats other organisms to obtain energy**

**Decomposer: breaks down dead and decaying matter to obtain energy**

* 1. Food chain, food web, trophic level

**Food chain: show how matter and energy transfer through an ecosystem**

**Food web: shows all the interactions between trophic levels and organisms in an ecosystem**

**Trophic level: a feeding step in a food chain**

1. What are biotic factors? What are some examples?

**All the living organisms that inhabit an environment. Plants, animals, fungi, bacteria.**

1. What are abiotic factors? What are some examples?

**The nonliving parts of an organism’s environment. Soil, temperature, water, light.**

1. How is energy different from matter?

**Energy is transferred through an ecosystem while matter is recycled.**

1. Why are food webs a better representation of energy transfer than food chains? Provide at least 3 ways food webs are better.

**Better for showing energy flow, more realistic because most organisms get food from more than one species, organisms can occupy more than one trophic level, food webs represent a network of interconnected food chains**

1. Why are food chains limited to 4-5 links?

**After the 4th link, the energy transferred is so small that it cannot sustain an organism.**

1. What is a protein and what is it used for?

**Molecules in your body that are used for building, maintaining, and replacing tissue in the body, making specialized protein molecules, such as hemoglobin, and helping to build muscle**

1. What is the difference between complete proteins and incomplete proteins? Provide 3 examples of each.

**Complete proteins have all 9 essential amino acids while incomplete proteins lack all 9 essential amino acids and need to be eaten in combinations.**

**Complete: poultry, fish, dairy, quinoa, buckwheat**

**Incomplete: rice and beans, spinach and almonds, hummus and whole-grain pita**

1. Be able to draw or interpret food webs, especially the direction of energy flow.
2. Would a producer have more or less pesticides than a top carnivore? Why?

**Less, producers have a relatively small amount of pesticide but as more and more producers get eaten, the pesticides accumulate through the food chain and build up. Eventually, the top level predator will have accumulated many pesticides.**

1. Be able to determine the trophic level of an organism in a food chain.
2. Do you have to eat meat to be healthy? Is it the only option? Why or why not?

**Meat is good because it is a complete protein and has all 9 essential amino acids but you don’t need to eat meat to be healthy. You can be vegetarian and still get all the essential amino acids you need if you eat incomplete proteins in combinations.**

1. Explain the 10% rule.

**90% of energy is lost as heat and waste while only 10% of energy is transferred from one trophic level to the next.**

1. How much energy is lost with each transfer of energy and where does this lost energy go? How?

**90% is lost and it is lost to the environment as heat and waste.**

**Succession (Chapter 3)**

1. Know what ecological succession, primary succession, and secondary succession are and the differences between them.
2. What is an example of a disturbance that would cause secondary succession? Primary succession?

**Primary: volcano**

**Secondary: fire, flood, tornado**

1. Describe the steps of succession. (Beginning, early, middle, late, end.)

**Beginning: bare site occupied by pioneer species, such as mosses and lichens**

**Early: grasses, flowers, shrubs**

**Middle: saplings**

**Late: more saplings, small trees**

**End: climax community, large trees**

1. What factors determine what the climax community in a given area will be?

**Soil quality and climate**

1. What is a pioneer species? What traits does it have? Give an example.

**First species to occupy a bare site. Very tough, can survive low moisture/nutrients. Beach grass, moss, lichens.**

1. Give an example of an ecotone.

**The UP.**

1. Why does succession happen?

**Species replace one another in accordance to changing tolerances. One species changes the conditions making them favorable for other species. Each species brings about its own demise.**

1. What happens to food chains, food webs, biomass, and species diversity as succession proceeds?

**They get large, more complex, and diversity increases.**

1. Define disclimax community and provide an example.

**A community that can never reach the end stage of succession because of human intervention. A park.**

1. Is primary or secondary succession faster? Why?

**Secondary, soil is already present and doesn’t have to be broken down by pioneer species.**

**Biomes (Chapter 3)**

1. Be able to identify a biome based on a description of moisture level, temp, vegetation, animals, and limiting factors.
2. Give an example of a limiting factor for each biome.
3. Know the unique characteristics of each biome.

**Population Biology (Chapter 4)**

1. What is a population? Give an example.

**A group of organisms all of the same species, which interbreed and live in the same place at the same time. Dogs in Negaunee.**

1. What 3 factors affect the growth rate of a population?

**Birth rate, death rate, migration rate.**

1. What is the difference between exponential and logistic growth? What type of curve does each have?

**Exponential growth: population growth that is extremely fast when resources are unlimited and conditions are optimal, “J” curve**

**Logistic growth: population growth that slows down and stabilizes when it reaches carrying capacity, “S” curve**

1. When a population reaches carrying capacity there are cycles of increases and decreases of population size. Why does this happen?

**Populations go up when supply is greater than demand and gown down when supply is less that demand. In other words, when resources are abundant populations can increase and when resources are low populations will die and decrease.**

1. Define limiting factors and provide 3 examples.

**Factors that limit the growth and size of a population. Food, shelter, water, space, predators, disease.**

1. What is the difference between density dependent factors and density independent factors? Provide 2 examples of each.

**Density dependent: depends on the size of a population, competition, disease, crowding, predation, food, competition**

**Density independent: factors that do not depend on population size and will happen regardless of size, weather, pollution, pesticides**

1. What are the symptoms of stress due to overcrowding on a population? Provide at least 3 examples.

**Increased aggression, decreased fertility, decreased parental care, decreased disease resistance**

1. Explain how age ratios can influence population growth rate.

**Huge population of young adults = the population will grow quickly, huge population of elderly = population will not grow or decrease**

1. What is the difference between emigration and immigration? Provide an example of each.

**Emigration: leaving a population, bees leaving a hive to start their own colony**

**Immigration: entering a population, deer from Marquette entering a population of deer from Negaunee**

1. Describe predator-prey relationships in regard to population size.

**If the prey population is large, the predator population will be large. If the prey population drops, the predator population also drops.**

1. What traits do rapid life-history pattern organisms have? Provide an example.

**Small body, mature rapidly, reproduce early. Bacteria, insects.**

1. What traits do slow life-history pattern organisms have? Provide an example.

**Large body, reproduce slowly, mature slowly. Elephant, bears, humans, whales.**

**Carbon Cycle, Global Warming, and the “Greenhouse Effect”**

1. Explain why carbon is important and how it cycles through an ecosystem. What processes cause carbon to enter the atmosphere? Living things? Soil?

**Carbon is an element found in all living things; living things depend on carbon for nutrition and it is found in bones and shells. Carbon cycles through the air, oceans, and is stored underground. Carbon enters the atmosphere as carbon dioxide during processes such as: respiration of fossil fuels, forest fires, etc. Carbon enters living things through the process of photosynthesis and through consumption of plants and/or animals. Carbon enters the soil when decay occurs and when high pressure and temperature convert carbon compounds into fossil fuels such as coal, oil, or natural gas**.

1. How have humans contributed to the carbon in the atmosphere other than respiration?

**Burning coal and fossil fuels, emission from cars.**

1. What are greenhouse gases? Give examples and their sources. How do they contribute to the greenhouse “effect?”

**Green house gases include:**

* **carbon dioxide. Sources: respiration of living things, volcanic activity, deforestation, burning of fossil fuels.**
* **water vapor. Sources: occurs naturally in the atmosphere.**
* **Methane. Sources: rice fields, cattle gas.**
* **Nitrous oxide. Source: plant decay**
* **Ozone. Sources: occurs naturally in the atmosphere.**

**These gases prevent heat from escaping into outer space and contribute to the warming of Earth’s surface.**

1. Define global warming.
2. What are 3 causes of global warming?
3. What are some of the effects or possible effects of global warming? How will it impact ecosystems, precipitation and weather patterns, animal species, health, etc?
4. How can humans reduce the problems associated with global warming?
5. What is your opinion on global warming? Be able to back up your answer with at least 3 facts.